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the department employing unqualified men in this work?

An examination was made to ascertain whether the hay used in Kansas, Missouri, and Illinois, contained ergot, and it was found that several grasses were badly infected with it; and a plate is given showing infected spikes of wild rye, timothy, red-top, and blue grass. It is stated that the proportion of ergot in some spikes of wild rye was ten or twelve per cent of the weight. A chapter is devoted to the nature, chemical composition, and action of ergot. In this chapter is an account of the ergot fungus (*Claviceps purpurea*), taken from botanical sources, and a plate is given showing the microscopical characters of the fungus. By some oversight, this plate, which is copied from Tulasne, is said to have been drawn from nature by Marx.

The ten pages devoted to 'investigations of swine-plague' are largely made up of a review of the work of Klein and Pasteur upon the same subject, with an insistence upon Dr. Salmon's claim to priority in the discovery of the organism said to be the cause of the disease. A few additional experiments are given tending to show that the specific cause lies in the action of a micrococcus arranged in pairs; and the statement is made that 'a large number of similar observations have been made,' but they are not detailed.

The main objection to be made to the experiments is to the use of *fluid-culture media*, which may be depended upon to give results, to be sure, but not always such as are satisfactory. Solid nutritive materials are by far the easiest in which to detect impurities; and by their use the study of the life-history of any particular bacterium may be carried out with much greater precision. We are aware that Dr. Salmon objects to the use of solid media, but, so far as we have seen, he has not stated the grounds of his objections.

It is impossible to criticise fairly a summary of results without complete knowledge of the experiments by which they were reached. It is stated that "the first annual report of the Bureau of animal industry, which will contain a detailed statement of the investigations made, . . . will be submitted . . . at the close of the year." We await its publication with interest, in the hope of obtaining that detailed statement free from criticism upon others. A direct and simple statement of work done and observations actually made is the method of real progress in the study of the bacteria. One's critics may be trusted to discover the merits or faults that may exist in comparison with the works of others.

A good translation by Mr. Theobald Smith, of Megnin's recent article on the gape-disease in fowls, and its accompanying parasite, which follows, will be of very general interest, and can be read with great profit by those interested in the general subject in all portions of the country.

A long report of the doings of an international veterinary congress, held at Brussels during September, 1883, by Prof. J. Law, seems rather out of place in the volume, because, of all the subjects con-

sidered, only one, 'The organization of a veterinary service,' could properly be brought to the notice of the commissioner of agriculture. It is interesting and instructive as showing how far ahead of us the nations of Europe are, in giving attention to the protection of their animals from disease, and what great resources they have in their state veterinary schools, from which to draw *proper* material for their state veterinary service.

Mr. J. H. Saunders's report of his trip to Europe is chiefly valuable and interesting in connection with information which he was able to gather in France regarding the Percheron horse; and his remarks should be read by those who contemplate making importations of these animals, or of any other breed of French horses. Mr. Saunders went to London, and travelled over the same ground in the veterinary privy-council office that had been gone over by agents of the agricultural department before, and with the same results; viz., our beef animals would be admitted free from the 'slaughtering restrictions' when we could show a clean bill of health, and not before. Also 'foot and mouth disease,' as landed in our cattle there, was contracted on board ship during the voyage, the ship having received the infection from British cattle.

Dr. H. J. Detmers gives a very unsatisfactory report of investigations made by him in Texas, of southern cattle-fever. One of his assertions, not in the least proven, however, is, well — new, to say the least; viz., that the virus of this disease is in the saliva of the southern animal. Such assertions, unless made for good and well-shown reasons, are to be deplored as tending rather to hide, than make clear, the very points for the elucidation of which the whole work was ordered done.

A very able paper upon trichiniasis, by Dr. Salmon, is reprinted from the report of a special commission upon the swine industry of the United States, and added to the volume, which closes with the usual reports from the unprofessional correspondents of the department concerning the general health of all kinds of farm animals throughout the country.

THE COAL QUESTION IN ENGLAND.

THE very serious problem of coal-supply has received a thorough review in a recent number of *Nature*. In 1861 the question was considered by Mr. Hull, who estimated that the available coal in Great Britain represented a total amount of 79,843,000,000 tons, which, consumed at the annual rate of 100,000,000 tons, would last about eight centuries. This estimate was later proved to be too high; and in 1871 a commission, appointed to investigate the question, reported that in England there were about 90,207,000,000 tons of coal developed, and about 56,273,000,000 yet unopened, making a total of 146,480,000,000 tons of available coal. Subsequent investigation proved this to be somewhat exaggerated. In these estimates thin seams less than a foot thick are not included,

and the strata are estimated to end at 4,000 feet in depth. Even if they do extend deeper, mining would be impracticable because of the expense; and, besides, the temperature would be 116° F. The deepest coal-pit in England is 2,448 feet, but one in Belgium extends 3,490 feet.

In 1831, 154,000,000 tons were extracted, — enough to build fifty-five great pyramids, or rebuild the great wall of China and add one-quarter to its length. The total amount of coal mined since 1854, would build a column 9 feet 4 inches in diameter, a distance of 240,000 miles, i.e., to the moon. The output shows considerable fluctuation from year to year, — as might be expected from the variety of accidental circumstances, such as new inventions, the mean annual temperature, and the state of trade, — but, on the whole, a very rapid increase; the output for 1875 being double of that for 1854, and that for 1883 double of that for 1862; and, if the amount extracted increases at this rate (3,000,000 tons annually), the supply will be exhausted in the year 2145 A.D. The exhaustion will be theoretical only; for in a comparatively short time the price of coal will increase, and the demand necessarily lessen, so that coal will never be exhausted. One of four things must then happen, — either some new source of energy must be supplied, or a larger per cent of the coal must be utilized, or coal must be imported, or England must give up her manufactories. It is doubtful if any new source of energy on a large scale will be discovered, unless some explosive be used for the purpose. According to Sir William Thomson, energy in the form of electricity can be transferred three hundred miles through a copper rod, with a loss of only twenty per cent: so in this way waterfalls may be utilized in the future.

While it is hardly possible to use less coal, we may get more energy out of it; for at present, out of a theoretical 10,000,000 foot-pounds of work which one pound of coal can supply, we only get 1,000,000 foot-pounds. But instead of a decrease in the waste, there is likely, on the contrary, to be an increase; for each year faster speed is demanded by rail, and steamships are rapidly replacing sailing-vessels. It might be possible to prevent the annual exportation of 22,880,000 tons by export duties; but that does not seem expedient. The idea of importation is hardly practicable, for the nearest coal-mines of any extent are in Canada and the United States. The former are not easy of access, but are almost unlimited; and those in the United States contain at least thirty-eight times as much coal as those in England. To supply England with the necessary coal, 2,100 ships as large as the *Paraday*, each carrying 6,000 tons and making thirteen trips a year, would be required. The cost would be necessarily greatly increased. In former times, England produced its own breadstuffs; now the greater part is imported. If coal becomes scarce, there will be no way of paying for food, emigration will begin, the death-rate will increase, the birth-rate decrease, and England will change once more to an open, cultivated country, devoid of all other industries.

PREHISTORIC AMERICA.

THIS translation of Nadaillac's 'Prehistoric America,' we are told, is made with the author's sanction; and it is also by his permission that certain portions of the work have been so 'modified and revised' as to bring them "into harmony with the results of recent investigation, and the conclusions of the best authorities on the archaeology of the United States." Speaking in a general way, these changes and additions may be said to be confined almost entirely to the chapters that relate to North America, and to consist, not in the discovery of new truths, although some additional facts are offered, but in the adoption of certain theories, as positive conclusions, which, in the original publication, are given as explanations, more or less probable, of the points at issue. Thus, for instance, in that portion of the work which refers to the origin and antiquity of man in America, we are given to understand that he is probably of Asiatic descent, all other theories being practically ignored. To this explanation, considered simply as such, we do not object. Appearances certainly favor it; and as it is the most satisfactory way of accounting for his presence here, and for certain peculiar features in his civilization, we do not see any reason why it should not be accepted, at least until something better is offered. That his ancestors arrived here at a period so remote that it can only be measured by geological epochs and phases of civilization, is conclusively proved; and though it is not equally susceptible of demonstration, yet we think it highly probable that these immigrants may have started from different centres, and gradually pushing their way westward across Bering Strait, and by way of the Polynesian Islands, may have landed at different times, and at different places, on the shores of both North and South America. That they belonged to different races, and were in different stages of development, is possible; and whilst we are willing to admit that "the culture which can be traced from the shell-heap to the mound, from the mound to the pueblo, and from the pueblo to the structures of Mexico, Central America, and Peru, is distinctively American," we may be pardoned for suggesting that it is possible, in view of what is said of the facilities of intercourse, not only between our tribes but between the continents, that this culture may have been colored by Asiatic influences of a comparatively recent date.

Prehistoric America. By the MARQUIS DE NADAILLAC. Translated by N. D'Anvers. Edited by W. H. Dall. New York, G. P. Putnam's sons, 1884. 566 p., illustr. 8°.